**BEFORE THE**
**FEDERAL COMMUNICATIONS COMMISSION**
**WASHINGTON, D.C. 20554**

| | | |
|---|---|---|
| In the Matter of | ) | |
| | ) | |
| Biennial Regulatory Review – Amendment of Parts 1, 17, 20, 21, 22, 24, 27, 73, 74, 80, 90, 95 and 101 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services | ) | WT Docket No. 04-180 |

**COMMENTS OF ERICSSON INC**

On May 11, 2004, the Federal Communications Commission ("FCC" or "Commission") issued a Public Notice initiating the 2004 Biennial Review to streamline and harmonize its regulations.[1] By the Public Notice, the Commission sought comment concerning which of its rules should be modified or repealed. Ericsson submits these comments in response to the Public Notice.

As an initial matter, Ericsson notes that the Commission is still conducting an investigation in its 2002 Biennial Review.[2] In the *2002 Biennial Review NPRM*, the Commission proposed revising its Part 24 base station Equivalent Isotropically Radiated Power ("e.i.r.p.") and transmitter output power limits. In that proceeding, Ericsson supported eliminating output power limits on transmitters and increasing e.i.r.p. limits for base stations.[3] Ericsson also proposed that the Commission eliminate language in the same rule that required power measurements to be

[1] *The Commission Seeks Public Comment in the 2004 Biennial Review of Telecommunications Regulations*, *Public Notice*, WT Docket No. 03-264, 19 FCC Rcd 9090 (2004) ("*Public Notice*").
[2] *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264, 19 FCC Rcd. 708 (2004) ("*2002 Biennial Review NPRM*").
[3] Comments of Ericsson Inc, *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (fil. Apr. 23, 2004) ("Ericsson 2002 Biennial Review Comments") at 2-5; Ericsson 2002 Biennial Review Reply Comments, *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (fil. May 24, 2004) ("Ericsson 2002 Biennial Review Reply Comments") at 3-9.

made based on "peak" power outputs and instead to conform the rule to accepted practice that measurements are permitted on either a "peak" or "average" basis.[4]

The Commission has not issued an order revising and streamlining rules in the 2002 Biennial Review. Ericsson asks that the Commission investigate these issues further in the 2004 Biennial Review proceeding if it does not adopt Ericsson's recommended rule changes in the 2002 Biennial Review.[5]

Specifically, Ericsson asks that the Commission seek comment on:

- Eliminating all references to "peak" or, alternatively, also including references to "average" each time "peak" is mentioned in Section 24.232 (a), (b), and (c) so that the rule will permit output power measurements on either a "peak" or "average" basis, without restriction;
- Revising its Section 24.232(a) transmitter limit to eliminate any output restrictions on transmitters;
- Revising its Section 24.232(a) base station e.i.r.p. limit to 6560 watts/MHz/carrier for channel bandwidths 1 MHz and greater, and 6560 watts per carrier for channel bandwidths less than 1 MHz; and
- Eliminating any output transmitter limits and mirroring these base station e.i.r.p. and "peak" rule changes in Section 27.50(d)(1) of its Advanced Wireless Services ("AWS") rules to ensure regulatory parity.

[4] Ericsson 2002 Biennial Review Comments at 10-11; Ericsson 2002 Biennial Review Reply Comments at 2-3.
[5] Even if the Commission adopts the modifications proposed in the 2002 Biennial Review proceeding, as the 2004 Biennial Review process matures, it may be appropriate to consider whether any intervening technological advances dictate further review and adoption of even higher power limits.

## I. The Commission's Rule Should Permit Output Power Limit Measurements on an Average as well as Peak Basis

In Ericsson's Comments in the 2002 Biennial Review, it asked the Commission to eliminate references to measuring output power on a "peak" basis in Section 24.232.[6] With this change, measurements may be made on either a "peak" or "average" basis.[7] Ericsson noted that making this change will conform the rule to current Commission practice, since the Commission currently allows average detection as an alternative to peak measurements for both transmitting carriers' and out-of-band emissions.[8] This change will also make the rule independent of radio access technology used. Average, not peak, measurements provide more accurate and relevant information for output power of technologies that have non-constant envelop signals, such as CDMA 2000 or W-CDMA.

If the Commission does not incorporate these changes in its 2002 Biennial Review Order, it should seek comment on them in the 2004 Biennial Review cycle.

## II. The Commission Should Eliminate Transmitter Output Power Limits and Increase Base Station e.i.r.p. Limits in Section 24.232(a)

In the 2002 Biennial Review, the Commission sought comment on whether its Part 24 transmitter power and antenna height restrictions, adopted in 1994, were still necessary. Recently, the Commission increased limits for power levels for base stations in certain wireless services that are located in rural areas or that provide coverage to otherwise unserved areas,[9] although the details of its ruling have not yet been published. The Commission should build on

[6] Ericsson 2002 Biennial Review Comments at 10-11.
[7] Alternatively, the Commission could retain "peak" and add "average" as an alternative measurement basis.
[8] Ericsson 2002 Biennial Review Comments at 10.
[9] *FCC Adopts Measures to Increase Rural Investment and Facilitate Deployment of Spectrum-Based Services in Rural Areas*, Public Notice, announcing the Commission's action *In the Matter of Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, 2000 Biennial Regulatory Review Spectrum Aggregation Limits, Increasing Flexibility To Promote Access to and the Efficient and Intensive Use of Spectrum and the Widespread Deployment of Wireless Services, and To Facilitate Capital Formation*, WT Docket Nos. 02-381, 01-14, 03-202 (rel. July 8, 2004) ("Rural Wireless proceeding").

its decision in the Rural Wireless proceeding by using this proceeding to investigate whether e.i.r.p. limits should be increased further and more broadly to extend to all wireless carriers in all locations, if it does not make these changes in the 2002 proceeding.[10] Specifically, Ericsson proposes that the Commission revise its Section 24.232(a) base station e.i.r.p. limit to 6560 watts//MHz/carrier for channel bandwidths 1 MHz and greater, and 6560 watts per carrier for channel bandwidths less than 1 MHz, as it recommended in the 2002 Biennial Review proceeding.[11]

Comments in the 2002 Biennial Review generally recognized that increasing power limits will improve service in rural and urban areas, encourage improved technology, and achieve other benefits.[12] For example, commenters noted that, with flexibility to use higher e.i.r.p., rural operators will be able to expand the reach of their existing systems and reduce the number of transmitting facilities required to provide service.[13] Commissioner Copps echoed this sentiment in his separate statement on the FCC's Rural Wireless decision. He said, "the authority to increase power in rural areas where interference will not be a problem . . . will

[10] If the Commission does not find that its record is sufficient to support eliminating transmitter output power limits in the 2002 Biennial Review, it should continue to investigate that issue as well in the 2004 Biennial Review.

[11] Ericsson 2002 Biennial Review Reply Comments at 8-9; Letter from Mark Racek, Director, Spectrum Policy, Ericsson Inc and Elisabeth H. Ross to Marlene H. Dortch, Secretary, Federal Communications Commission, June 29, 2004 at 2.

[12] *See* Ericsson 2002 Biennial Review Comments at 3; Comments of Motorola, Inc., *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (fil. Apr. 23, 2004) ("Motorola 2002 Biennial Review Comments") at 4; Comments of Qualcomm Incorporated, *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (fil. Apr. 23, 2004) ("Qualcomm 2002 Biennial Review Comments") at 2, 8; Comments of Powerwave Technologies, Inc., *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (fil. Apr. 23, 2004) ("Powerwave 2002 Biennial Review Comments") at 6; Comments of Cingular Wireless LLC, *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (fil. Apr. 23, 2004) ("Cingular 2002 Biennial Review Comments") at 3-4.

[13] *See* Powerwave 2002 Biennial Review Comments at 6; Qualcomm 2002 Biennial Review Comments at 8; Motorola 2002 Biennial Review Comments at 4.

reduce the costs of serving these areas."[14] Additionally, rural operators will have more flexibility to determine system architecture, including the number of base stations they deploy to serve a particular area.[15] Through these means, rural operators will be able to operate more efficiently, expand services, and extend coverage.

In a similar way, commenters noted that increasing the base station e.i.r.p. limit will provide a direct benefit for urban area applications. For example, commenters explained that urban operators will be able to improve the indoor coverage, grade, and quality of service provided to urban customers.

Commenters also discussed that eliminating or increasing e.i.r.p. limits will promote use of new technologies, such as higher gain directional antennas, and will encourage improvements in the design of subscriber products. Higher gain antennas improve performance in both the reverse link and forward link directions and translate directly into improved coverage without requiring as many base stations.

For these reasons, almost all parties who commented on the transmitter limit in the 2002 Biennial Review supported eliminating the 100 watt transmitter output power limit in Section 24.232(a).[16] Also, a number of parties who commented on the base station limit agreed that the

---

[14] Rural Wireless proceeding, Public Notice, Separate Statement of Commissioner Michael J. Copps, Approving in Part, Dissenting in Part, *FCC Adopts Measures to Increase Rural Investment and Facilitate Deployment of Spectrum-Based Services in Rural Areas*, *In the Matter of Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, 2000 Biennial Regulatory Review Spectrum Aggregation Limits, Increasing Flexibility To Promote Access to and the Efficient and Intensive Use of Spectrum and the Widespread Deployment of Wireless Services, and To Facilitate Capital Formation*, WT Docket Nos. 02-381, 01-14, 03-202 (rel. Jul. 8, 2004).

[15] *See* Powerwave 2002 Biennial Review Comments at 6; Motorola 2002 Biennial Review Comments at 2; Ericsson 2002 Biennial Review Comments at 3-4.

[16] *See* Motorola 2002 Biennial Review Comments at 2; Qualcomm 2002 Biennial Review Comments at 3; Ericsson 2002 Biennial Review Comments at 1; Powerwave 2002 Biennial Review Comments at 2, supporting elimination of the limit**.** Lucent opposed eliminating the limit because it may require certification to be based on effective radiated electric field strength, which is more difficult than transmitter output power to define and more burdensome. Alternatively, Lucent supported Powerwave's suggestion that certification be independent of transmitter power limits and be based on compliance with out-of-band emissions limits. In this case, Lucent would support elimination of the limit. Ericsson supported comments made by Powerwave and Lucent that certification should be

Commission should modify base station e.i.r.p. limits.[17] The parties presented different proposals on how the Commission should change base station e.i.r.p. limits, however.

Specifically, Motorola recommended that the Commission adopt a base station e.i.r.p. limit of 1640 watts per-carrier for carriers less than 1 MHz, and 1640 watts/MHz for channel bandwidths 1 MHz or greater. On the other hand, Qualcomm proposed that the Commission adopt a base station power limit of 5040 watts e.i.r.p./MHz for all technologies, or approximately six dB (four times) above the present limit, measured in 1 MHz.[18]

Ericsson agreed with Qualcomm that, since the Commission adopted the 1640 watt e.i.r.p. limit in its original PCS technical rules, there have been substantial improvements in low-noise amplifier and receiver technology.[19] In particular, the sensitivity of receivers has improved significantly, far beyond performance technically possible in the early 1990's (*e.g.*, tower mounted low-noise amplifiers, four-branch receiver diversity). A reasonable reflection of this improvement, as stated by Qualcomm, is 6 dB or approximately 4 times the *present* limit. Qualcomm noted that the improved technology allows operators, especially in rural environments, to provide greater range on the reverse link in circumstances where extended coverage is desirable, but where capacity needs are not substantial. As Qualcomm pointed out,

---

based on out-of-band emission limits, as set forth in 47 C.F.R. § 24.238. *See* Comments of Lucent Technologies Inc., *In the Matter of Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket No. 03-264 (fil. Apr. 23, 2004), ("Lucent 2002 Biennial Review Comments") at 2.

[17] *See* Ericsson 2002 Biennial Review Comments at 11; Motorola 2002 Biennial Review Comments at 3; Qualcomm 2002 Biennial Review Comments at 3; Powerwave 2002 Biennial Review Comments at 2; Cingular 2002 Biennial Review Comments at 4.

[18] Qualcomm 2002 Biennial Review Comments at 3; Letter from Dean R. Brenner, Senior Director of Government Affairs, Qualcomm Incorporated to Ms. Marlene Dortch, Secretary, Federal Communications Commission, June 30, 2004.

[19] Qualcomm 2002 Biennial Review Comments at 2.

rural wireless operators must operate their base stations at higher power so that they can also extend the forward link range in order to take full advantage of the technological improvement.[20]

Therefore, in its compromise proposal, Ericsson recommended that the Commission combine the narrowband/wideband rule structure that Motorola proposed with higher e.i.r.p. limits based on Qualcomm's proposal. Increasing the current 1640 watt e.i.r.p. limit by four times, to reflect current improvements in antenna, amplifier, and receiver technology, Ericsson said, increases the limit to 6560 watts. Ericsson noted that the combined revision will not negatively impact existing or future base station deployments of any technology that rely on the *de facto* interpretation of the e.i.r.p. limit on a per-carrier basis and will not risk increased harmful interference.[21]

To the extent the Commission does not adopt these specific rule changes in the 2002 Biennial Review or Rural Wireless proceeding, it should propose the following textual changes in the 2004 Biennial Review:[22]

> Sec. 24.232 Power and antenna height limits
>
> (a) Base stations are limited to an ~~1640 watts peak~~ equivalent isotropically radiated power (e.i.r.p.) of 6560 watts/MHz/carrier for channel bandwidths 1 MHz and greater, and 6560 watts per carrier for channel bandwidths less than 1 MHz with an antenna height up to 300 meters HAAT.

## III. The Commission Should Conform its Part 27 AWS Base Station e.i.r.p. Limits to these Part 24 Revisions

If the Commission seeks comment on these Part 24 revisions in the 2004 Biennial Review, it should also include parallel revisions to its Part 27 rules. Applying the same e.i.r.p.

---

[20] *Id.*

[21] The Commission already has rules in place that control interference where operators are using different frequency blocks within the same geographic area (47 C.F.R. § 24.238) and where operators are using the same frequency blocks in different geographic markets (47 C.F.R. § 236). Therefore, other rules prevent harmful interference and the Commission does not need to rely on Section 24.232(a) for that purpose.

[22] Ericsson includes its proposed revisions to Section 24.232 (b) and (c) to eliminate "peak" at Appendix A.

limit and removing the ambiguity of "peak" in Sections 24.232(a) and 27.50(d)(1) will eliminate any concerns about regulatory parity. As with the Part 24 revision, allowing more power will also facilitate deployment of services in rural areas by allowing greater coverage while using less infrastructure.[23] Ericsson asks that the FCC seek comment on the following rule revision:

> §27.50 Power and antenna height limits.
>
> (d)(1) Fixed stations transmitting in the 1390-1392 MHz and 1432-1435 MHz bands are limited to 2000 watts e.i.r.p. peak power. Fixed stations transmitting in the 1392-1395 MHz band are limited to 100 watts e.i.r.p. peak power. Base stations transmitting in the 2110-2155 MHz bands are limited to an equivalent isotropically radiated power (e.i.r.p.) of 6560 watts/MHz/carrier for channel bandwidths greater than 1 MHz, and 6560 watts per carrier for channel bandwidths less than 1 MHz.

## V. Conclusion

If the Commission does not make changes to Section 24.232 to eliminate "peak" and transmitter output limits in the 2002 Biennial Review or to increase e.i.r.p. limits fully in either the 2002 Biennial Review or Rural Wireless[24] proceeding, the Commission should continue to investigate these issues more fully in the 2004 Biennial Review. Specifically, the Commission should propose the following rule changes:

- Remove "peak" as the only measurement basis in Sections 24.232(a), (b), and (c), so that the rule will permit measurements on an "average" basis as well, without restriction, or add "average" as an alternative measurement basis so that both methods are expressly included in the rule text;
- Eliminate the 100 watt transmitter output power limit entirely in Section 24.232(a);

[23] Motorola 2002 Biennial Review Comments at 4.
[24] Although the Commission acted in the Rural Wireless proceeding, the details of the Commission's action have not been made public.

- Modify the e.i.r.p. limit in Section 24.232(a) to 6560 watts/MHz/carrier for channel bandwidths 1 MHz and greater, and 6560 watts per carrier for channel bandwidths less than 1 MHz; and
- Mirror these base station transmit output power, e.i.r.p. and "peak" rule changes in its Part 27 AWS technical rules (Section 27.50(d)(1));

These rule changes will promote important policy goals, including improved coverage and cost-effective operations for rural and urban wireless carriers, and ensure that the Commission's rules are applied in a technologically neutral manner. As it continues to develop its record, the Commission may want to consider increasing e.i.r.p. limits six or seven times the current 1640 limit to recognize even greater advances in antenna technology that are now being developed and incorporated into wireless systems. The Commission should continue to update its rules to keep pace with technological changes so that operators can bring the full advantages of new technology to wireless consumers.

Respectfully submitted this 12th day of July, 2004.


Mark Racek, Director, Spectrum Policy
Barbara Baffer, Vice President
Public Affairs and Regulations
Ericsson Inc
1634 I Street, N.W., Suite 600
Washington, D.C. 20006-4083
Telephone: (202) 824-0110
Facsimile: (202) 783-2206

Elisabeth H. Ross
Marjorie K. Conner
Birch, Horton, Bittner & Cherot
1155 Connecticut Avenue, N.W.
Suite 1200
Washington, D.C. 20036
Telephone: (202) 659-5800
Facsimile: (202) 659-1027


G:\101258\3\MKC0015.DOC